DOCUMENT RESUME

ED 345 751 IR 054 087

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TITLE How Special Librarians Really Use the Internet: Summary of Findings and Implications for the Library of the Future.
PUB DATE 29 Mar 92
NOTE 12p.; "This report was posted on March 29, 1992, to nine computer conferences where call for participation announcements had been posted in the summer of 1991: BUSLIB-L, LIBREF-L, LIBRES, MEDLIB-L, PACS-L, LAW-LIB, LIBADMIN, MAPS-L, and PAMnet."
AVAILABLE FROM Internet, through anonymous file transfer protocol (ftp), using the following location (hydra.uwo.ca), directory (LibSoft), and filename (SPEC underscore Libs.txt).
PUB TYPE Reports - Research/Technical (143)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Access to Information; *Computer Networks; Databases; *Electronic Mail; Electronic Publishing; Information Networks; *Librarians; Library Surveys; Online Searching; Online Systems; *Special Libraries; Telecommunications; Teleconferencing; User Needs (Information); *Use Studies
IDENTIFIERS BITNET; *INTERNET

ABSTRACT

A five-page electronic questionnaire was sent to 113 special librarians who responded to "Call for Participation" announcements posted on nine computer conferences in July 1991 and a similar announcement in the August 1991 issue of the monthly newsletter of the Special Libraries Association. Fifty-four librarians completed the questionnaire, which sought information on the computer conferences to which they subscribed; the length of time they had been using either BITNET or the Internet; and the type of training they had had in using either of the two networks. In addition, the respondents were asked to rank five functions or capabilities available on either BITNET or Internet--electronic mail and computer forums, remote database searching, file transfer and data exchange, research and publication on the Internet--by extent of use. They were also asked to determine the importance and value of BITNET or Internet to their work and for special librarians in general. Analyses of the responses indicated that the respondents' median experience level on the Internet or BITNET was 24 months; 65% of the respondents had trained themselves on the Internet, while 59% had learned informally from a colleague; formal training ranging from a single one-hour class to more structured learning was available to 39% of the librarians; and an overwhelming majority of the special librarians in the study (93%) used the Internet for electronic mail. (MAB)

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HOW SPECIAL LIBRARIANS REALLY USE THE INTERNET:

SUMMARY OF FINDINGS AND IMPLICATIONS FOR THE LIBRARY OF THE FUTURE[1]

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In the Summer of 1991 we asked special librarians with access to BITNET and Internet to tell us how they use these networks and what value they receive from this use. We hope that our findings will serve as a basis for future research in the use of electronic communications technology by information professionals within the modern organization, including the effects of these technologies on the role and position of the information professional within the organization.

RATIONALE

While there has been a veritable explosion of articles in recent years on libraries and the Internet, there is a singular lack of published research on how the Internet is actually used by librarians. Articles on the Internet typically discuss policy issues, describe network services and guides, or discuss user support and promotion. Most address in some way the idea that Internet (or BITNET, or NREN) connectivity is the key to the library of the future, but none examine actual use other than as case studies or histories. This research, then, departs from the current body of Internet literature by addressing these questions:

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[1]This report was posted on March 29, 1992, to nine computer conferences where "call for participation" announcements had been posted in the Summer of 1991. These conferences are BUSLIB-L, LIBREF-L, LIBRES, MEDLIB-L, PACS-L, LAW-LIB, LIBADMIN, MAPS-L, and PAMnet.

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How is the Internet actually being used by practicing librarians today? Are the network services and efficiencies touted in the literature being used like their designers intended?

Special librarians are a unique group to study because they have a knowledge base in more than one discipline. Special librarians are, for the most part, not only information professionals holding advanced degrees in library or information science, they are also specialists in one or more subject areas, often with postgraduate training in science, business or law. In addition, many special librarians in science or technology fields work closely with researchers who have been using Internet precursors such as ARPANET, NSFNET and MILNET for years. Special librarians, whether managers of industrial libraries or academic subject specialists, are more often in public services positions, and they may use the Internet differently from technical services or systems librarians. The lack of research on special librarians' use of interactive communications technology leads us to ask the following questions: Do special librarians differ from other types of librarians in their use of the Internet? How do they interact with their users who may already be using these inter-connected networks for their own research activities? How does their use of the Internet compare to their use of internal e-mail systems within their own organizations?

In this report, we have limited our discussion to Internet use and training and implications of this use for the library of the future. For the sake of brevity, we have included only a cursory description of our methodology.

PROCEDURE AND PARTICIPANTS

Participants were solicited through "Call for Participation" announcements posted on nine computer conferences in July, 1991, and through a similar announcement in the August issue of the *SpeciaList*, the monthly newsletter of the Special Libraries Association. We sent a five-page electronic questionnaire to the 113 librarians who responded to this initial announcement; the 54 special librarians who responded to this second survey are the focus of our study. Our respondents were self-selected; we made no attempt at probability sampling because our purpose was to find out the ways in which special librarians use the Internet, not their extent of use.

On the "Call for Participation" announcement we included a brief questionnaire which potential respondents were asked to return, either electronically, via fax or regular mail. Here we asked respondents to list the computer conferences

to which they subscribed; the length of time they had been using either BITNET or the Internet; and to "Briefly describe (in a paragraph or less) your use (and/or your patrons' use) of BITNET or the Internet." On the five-page questionnaire we asked a series of structured questions to find out how and for what purposes our respondents used BITNET or Internet, so that we could flesh out the information we had already received through the preliminary survey. We asked them, for example, to rank five functions or capabilities available on BITNET or Internet by extent of use and to describe how they used these functions. We also included a series of questions about training and costs involved in accessing these systems.

To determine the importance and value of BITNET or Internet to their work and for special librarians in general, we asked a series of unstructured open-ended questions at the end of the survey form. We asked respondents to describe, based on their experience, "the major advantage or opportunity for special librarians in using BITNET/Internet"; "the major disadvantage or barrier for special librarians in using BITNET/Internet"; their "most interesting or memorable experience on BITNET or Internet"; and finally, we asked them for "any other comments [they'd] like to make about the use of BITNET or Internet by special librarians."

Sixty-five percent of our respondents are academic librarians and 59% are in libraries with a subject emphasis in science or technology. Other subjects represented are law, medicine, maps and business. All five respondents from for-profit corporations are in the computer industry. Our participants represent a wide range of administrative levels: 34% are in management (library directors, assistant directors or branch or department heads) and 55% are subject specialists. They work in libraries ranging in size from the single person library to larger academic libraries with several hundred employees. Librarians from the most technologically advanced institutions to smaller colleges and universities outside the urban, technological mainstream are represented in our study. Although 93% of our respondents are located in the United States, we also have participants from Canada, Argentina and The Netherlands.

EXPERIENCE, TRAINING AND COST

Respondents' median experience level on the Internet (or BITNET) is 24 months: 16 respondents have used these networks for 12 months or less; 19 reported 13 to 36 months experience; and an additional 19 have accessed the Internet for more than three years. Respondents' use of Internet or BITNET is heavier than their use of e-mail within their own

organization: 59% spend between two and five hours each week in Internet-related activity, whereas only 33% spend this amount of time on their internal e-mail systems ($z = 2.81$, $p < .01$). Seven respondents have never used electronic mail within their parent organization.

We asked survey respondents whether the library/department or the parent organization paid for access to the Internet, and how this compared to the expense for internal e-mail. Most respondents had the cost of both internal and external e-mail paid for by their parent organizations. Slightly more libraries had to pay for access to internal e-mail from their departmental budgets than for Internet access, but this difference was not significant. Approximately 20% of the respondents did not know who paid for either internal or external e-mail.

As might be expected, the longer someone has searched the Internet, the more they were responsible for their own instruction. We asked respondents to check as many of the types of training they had received as applicable. 65% of the respondents taught themselves. 59% learned informally from a colleague. Formal training from a single one-hour class to more structured learning was available to 39%. The fact that none of them learned in library school could easily be a function of when the respondents attended library school, but we did not ask that question. Two other categories were cited by several respondents: learning by asking questions on the Internet itself and use of documentation provided by the local computer center operation. Descriptive responses showed some respondents learning with a minimum of hand holding; these did not see the need for instruction offered by their local computer centers.

In answer to our question of what training should be provided for new users and who should provide the training, respondents identified very specific knowledge that should be imparted in the training. The need for coverage of both theory and basic training techniques were frequently mentioned. Training should cover both history and philosophy of the Internet along with what it is, what's out there, and how it works. Useful training sessions would include training in FTP, telnet, mail, Netnews, addressing algorithms, proper etiquette, security rules to safeguard computers/data, how to connect to the Internet, how to keep up with Internet developments and changing resources, how to manage the flow of information, and how this differs from the other (for pay) online services. A second area of training addressed librarians' needs: how the Net can be helpful to librarians, its potential for libraries, how to identify information nodes to locate and access forums and

publishers of relevance to one's interests, how to make the best use of increased connectivity to streamline library procedures, and how to persuade important vendors to provide e-mail access or EDI.

While a few respondents questioned the need for any instruction, most respondents assigned responsibility for training to multiple bases: parent organizations (by both libraries and computer centers), professional associations and library schools. Instructional tools cited were print documentation, video, and demo disks. There was a recurrent theme of the need for easy-to-use packaged information.

HOW THE INTERNET IS USED

We organized responses to the open-ended question, "Briefly describe your use of BITNET or the Internet," into six umbrella categories: work-related communication and electronic mail, computer conferences and electronic journals, remote database searching, file transfer and data exchange, research and publication, and personal communication and leisure activities. Table 1 shows the percent of use by category:

Table 1

USE OF BITNET/INTERNET BY SPECIAL LIBRARIANS

Use*	Percent
Work-related communication, e-mail	93%
Electronic forums, BBS, listservs	61%
Searching remote databases (telnet)	39%
File transfer (FTP), data exchange	37%
Research and publication	22%
Personal communication, leisure activities	11%

*Multiple responses possible; percents do not total 100.

Except for file transfer activities, there are no differences in use of these Internet functions by type of library (academic vs. other types), subject emphasis (sci-tech vs. other subjects), or experience level (length of time on the Internet).

Electronic mail and computer forums:

The findings displayed in Table 1 are striking and unequivocal: the principal use of the Internet by the special librarians in our study is for electronic mail. The most common reason our respondents use the Internet is to communicate with colleagues and friends, and the value of this activity was stressed over and over again. Many respondents reported that access to the Internet reduces geographical distance and feelings of isolation from colleagues and instills a sense of collegiality and connectedness with other library professionals. Others mentioned the speed of communication -- saving time, reducing telephone tag, eliminating phone calls. Other reasons for use of e-mail on the Internet mentioned by respondents include getting quick copyright permission, providing and receiving electronic reference and technical assistance, requesting and providing ILLs, requesting library materials, missing issues, duplicate exchanges, identifying document sources, submitting applications for employment, and facilitating professional association business and committee work.

Special librarians are active participants in computer discussion groups. They do not limit themselves to library-related lists but monitor and join relevant sci-tech and business discussions as well: our 54 respondents belong to 68 different computer discussion groups. Respondents mentioned the following benefits: (1) a focussed forum for topics of interest to a specific audience; (2) an excellent and swift communications vehicle where questions can be raised and answers provided to all the participants, rumors can be defused, and reasons for actions can be explained once and transmitted easily to the entire audience; and (3) reduced telecommunication costs because it costs the same to send a message to one person as to send it to a large group.

Remote database searching:

Thirty-nine percent of our respondents reported that they access remote computer systems on the Internet. Of these, 80% mentioned that they search other library catalogs. They search OPACs for a variety of traditional task-related reasons: to check availability status or identify ownership before requesting an interlibrary loan, for collection development and acquisitions work, and for reference. Others mentioned that they search remote catalogs evaluatively, to test other search interfaces or to see what other libraries are doing with their automated systems.

Several respondents made reference to specific library systems with expanded search capabilities beyond access to

the library's OPAC, such as the University of California's MELVYL and the Colorado Alliance of Research Libraries CARL system. Others mentioned that they use the Internet to access non-library bibliographic services such as RLIN, OCLC's EPIC, Medline, and Dialog.

Substantially fewer special librarians search non-bibliographic databases on the Internet compared to library catalogs and other bibliographic systems. Astronomy librarians are more involved in their use of the Internet for non-bibliographic information than librarians in other disciplines, which is no doubt due to the vital role that the Internet plays in the astronomy research community.

File transfer and data exchange:

Thirty-seven percent of our respondents use the Internet to transfer files, about the same proportion that log into remote databases. Unlike electronic mail and remote database searching, there are differences in the use of file transfer utilities by network experience level: 50% of the experienced users (defined as respondents who have used BITNET or Internet for more than two years) send or retrieve files over the Internet, compared to only 25% of their less experienced colleagues ($z = -1.96$, $p = .05$). More sci-tech librarians also use file transfer utilities than do special librarians in other disciplines, but these differences are not significant ($z = 1.32$).

Like remote databases, respondents for the most part consider file transfer functions secondary to their use of electronic mail. They often discuss file transfer with remote login, indicating that there may be a conceptual blurring of these two Internet functions. Special librarians on the Internet use FTP to obtain files resident on remote systems; others request files through BITNET listservs. For example, several reported that they download computer-related information from remote servers, such as the WAIS application from Thinking Machines, listserv-specific reports such as PACS-L Review articles, computer science technical reports, and shareware. Many retrieve Internet guides such as the Barron and St. George directories, Kovacs' directory of computer forums, and Strangelove's directory of E-journals. Several retrieve regulatory reports and government documents, technical reports, or receive alert services from Dialog, SRI documents, and newsletters.

Special librarians also send files on the Internet backbone. Examples include search results to remote users, acquisitions lists, and Project Gutenberg files. Astronomy librarians, again, are particularly active in file transfer

activities.

Research and publication on the Internet:

Twenty-two percent of our respondents described uses of the Internet related to research and publication. Our respondents use the Internet in two ways: as researchers collaborating with colleagues at other institutions and connecting with journal editors and book publishers, and as editors of newsletters or journals who are themselves responsible for communicating with contributors. Their experiences demonstrate how the Internet enhances the dissemination of information to members of the library science community, by providing access to people through electronic mail and access to electronic information through file transfer and remote login.

The value of communication:

We asked study participants to describe, based on their own experience, the "major advantage or opportunity" for special librarians in using the Internet. All 50 respondents who replied to this question mentioned some aspect of electronic communication in their responses. In other words, these special librarians who themselves are active Internet users consider electronic mail to be the major reason why special librarians should use the Internet, because it provides a convenient, timely, nondisruptive, and inexpensive mechanism for communication with their colleagues throughout the world.

Over and over respondents mentioned the same things: "Truly breaks down the walls (physical, psychological, economic) to communication," "Contact with other special librarians in your area without having to travel...," "Ease of communication when you want it," "...communication of ideas and discussions will take place via e-mail that will never see the light elsewhere...," "To communicate with colleagues on topics of mutual interest," "...a way of sharing in real-time, information & experience...," "The ability to share information with colleagues throughout the world in a timely fashion," "Instantaneous world-wide communication with colleagues for information-gathering and idea-sharing," "...forming a greater library community based on interest rather than on geography...," "...forging new and unique work relationships with colleagues ... geographically close or far...," "...rapid communication with colleagues who can provide a wealth of experience...," "The ability to communicate with others in similar situations...," "To interact all over US and world -- time differences are eliminated and your colleague is always 'home',"

"...communication and sharing with colleagues on both specific problems/questions and general issues...."

IMPLICATIONS OF OUR FINDINGS

The use of the Internet for communication by the special librarians in our study parallels what happened with early users of ARPANET. ARPANET was established by the Department of Defense as a way for computer scientists and other researchers with defense contracts to share expensive resources. Electronic mail was added as an afterthought, and was considered by some of the DOD systems people to be unnecessary -- peripheral to the research functions for which the network was designed. Contrary to expectations, however, electronic mail became the most popular feature of the network because it provided a way for researchers to talk to each other -- to exchange ideas and discuss problems. Like the computer scientists and other early users of ARPANET, the librarians in our study also use the Internet to talk to each other and to their patrons -- fielding inquiries, finding answers, identifying resources, solving problems, i.e., they use the Internet primarily for communicating, not for building or even accessing collections.

In one respect, librarians who use the Internet are no different from any other user group -- they use it to communicate with each other as well as to obtain "hard data" (i.e., tap into resources). But librarians can do something else as well as a result of their training and knowledge of information processes and information organization -- they can go beyond using the Internet as a resource and use their skills to help make it less chaotic.

To understand why the electronic mail function is so important, it may help to conceptualize the Internet as a giant parallel processing computer. People use the Internet to communicate -- to talk to each other, pose questions and provide answers. Information between and among people flows in parallel, in real time. But this is not the only use: there is something else going on here, in that resources are available too, also in parallel. Published articles about the Internet emphasize these resources (library catalogs, remote databases full of esoteric data) and the physical strands (optical fibers and satellites) that tie it all together. These strands, however, are not just the physical connections -- these strands are also the human connections, the communications between individuals and among groups of people. People are still the most efficient parallel processing information filters there are.

The important thing is that you don't have to talk to one person at a time. People place requests for information across a universe of potential responders, instead of dealing with one responder at a time. As in computer processing, this is a vastly more efficient way of processing information. Potential responders screen the requests for information to see if they are applicable to their interests or their abilities to respond. Thus people who normally would not be considered in the loop to solve a particular problem find themselves in the position of providing valuable information to each other. The emerging global community created by these systems is more democratic and less hierarchical than conventional systems.

The people who communicate on the Internet provide meaning and understanding -- they create a synergy that's not possible with human-machine linkages alone. It's the human-human linkages that are important because this technology-enhanced interaction is what will have the biggest impact on our organizations of the future. Because it's people that ask questions and people that answer questions and people that discuss issues -- and it's people that develop files ready to be retrieved from central depositories, and not just central depositories, but locations that can exist anywhere -- it doesn't matter if the data you need is located centrally in the bowels of the National Library of Medicine or exists on the VAX in Podunk U -- the interconnectedness of the Internet makes location irrelevant. In the same way, it doesn't matter if you are a special librarian located in a university on the mainland and need to talk to an astronomer on a mountaintop in Oahu -- you can do this practically instantaneously via the Internet. Further, it doesn't matter if that astronomer is in the middle of complicated calculations or on a conference call to The Netherlands, she will get your message at her convenience, without her thought processes being interrupted.

Electronic mail on the Internet provides a mechanism for community. To create AI navigators, online directories, and other electronic guides to the network without human interaction removes community from scholarship. The "scholar's workstation" has been proposed as the ideal toward which we should strive. But perhaps we ought to rethink this "ideal": in an isolated, machine-based network of information sources, do we run the risk that knowledge will be created in isolation? Will scholars toil at their computer workstations, tapping into vast and varied databases of information, guided by artificial intelligence front-end gateways to the next bit (or byte) of data, thereby eliminating communication with others in their intellectual pursuit?

The participants in our study tell us something that we may have forgotten in our infatuation with the new forms of information made available through the Internet. And that is their need for community. To be sure, our respondents use the Internet to obtain information not available in any other format, to access databases and OPACs that provide new efficiencies in their work, new ways of working. But their primary use is for communication. Special librarians tend to be isolated in the workplace -- the only one in their subject specialty (in the case of academe), or the only librarian in their organization (in the case of a corporate library). Time and time again our respondents expressed this need to talk to someone -- to learn what is going on in their profession, to bounce ideas off others, to obtain information from people, not machines.

There are tremendous implications from the Internet technology in community formation -- the Internet may indeed provide a way to increase community among scholars, including librarians. The danger we face at this juncture in time, as we attach library resources to the Internet, is to focus all of our energies on the machine-based resources at the expense of our human-based resources, i.e., ourselves. Do we really want solely to create an objective, distant, remote, value-free "knowbot" to direct users to library-resident, machine-readable resources residing on the Internet? We see the need at the same time to create a human interface -- a community of knowledge navigators serving to connect people who can interact in their pursuit of truth.

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